REMARKS

The Examiner's Action of January 12, 2006 is noted in which the claims are rejected under 35 USC 102 as anticipated by Allen et al., and under 35 USC 103 as being unpatentable over Allen et al.; over Allen et al. in view of Brown; and over Allen et al. in view of Leonard et al.

As claimed, this system utilizes ultrashort nanosecond pulses and a direct-reading focal plane array along with thresholding and a filter that discriminates against ground returns.

It is important to note that the subject system uses nanosecond ultrashort pulses so that one can discriminate against ground returns that have a persistence greater than the nanosecond pulse length of a pulse.

For instance, if the pulse returned from the seeker's retro-reflector has a duration of 0.25 nanoseconds, for oblique angles, the ground clutter return can be stretched to 6 nanoseconds.

Nowhere in the references cited is shown or taught discrimination against ground clutter and certainly not by the method claimed of ignoring returns that exceed the nanosecond pulse length.

Allowance of the claims on this basis alone is requested.

The seminal physical principle here is that when trying to detect a seeker that is launched from the ground, the oblique angle of the illuminating laser radiation causes elongated returns from the ground because the area on the ground that is closest to the

laser returns energy first, whereas the area on the ground furthest away from the laser returns energy later.

This phenomenon is only useable with ultrashort, nanosecond pulses.

The second phenomenon that is operative that allows one to detect the difference between a seeker and the ground clutter is a direct-reading focal plane array that simultaneously reads out all of the pixels.

There can be no storage, no integration and nothing interposed that would obscure the difference between returns that are very sharp and the elongated ground clutter returns.

The third physical principle involved here is the fact that returns from the seeker are of much higher amplitude than the returns from the ground. When one couples amplitude discrimination with throwing out returns that have elongated durations, one gets an exceptionally robust system for eliminating ground clutter.

With respect to the Allen et al. reference, it would appear this reference is not a direct-readout system because as explained by the Examiner there is a data sampler 40, temporary data storage 42, a buffer 48, and an analog-to-digital converter 50. It is eminently clear that this system, with all the delays, buffering and storage, cannot detect nanosecond pulse lengths.

Moreover, nowhere in this reference is shown or taught how to discriminate against ground clutter.

Rather, the Allen et al. patent is used for target shape detection and utilizes complicated and high-latency processing to do so.

Secondly, the combination of Allen et al. and Brown does not indicate a ground clutter rejection system because the pulse width discrimination of Brown is not used for this purpose. Rather it is used to determine the sector scan interval, which has nothing to do with ground clutter.

Finally, the rejection that combines Allen et al. with Leonard et al. likewise does not show the claimed subject matter. Rather the Leonard et al. reference simply provides for adjustable intensity thresholds so that the array can work with a wide variety of light intensities. The entire thrust of the Leonard et al. reference is to be able to generate a three-dimensional image that critically depends upon the ability to provide intensity resolution.

Thus the Leonard et al. system has nothing to do with eliminating ground clutter.

Moreover, the Leonard et al. signal processing circuits that involve a clock, computer and shift registers, do not act in a time frame commensurate with being able to distinguish elongated ground clutter returns from unstretched returns from a missile seeker.

On the other hand, the claimed direct-reading simultaneous focal plane array can and does react sufficiently quickly to distinguish ground clutter from returns from a seeker precisely because there are no shift registers or computers involved. Nor is there any data sampler, temporary data storage, buffer or other computational elements that make the Allen et al. system unable to distinguish retro-reflected returns from a seeker from the diffuse, stretched returns from the ground.

Since the references either singly or combined do not show or teach the claimed subject matter, allowance of the claims and issuance of the case are earnestly solicited.

Respectfully submitted,

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Date: May 12, 2005